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 Sc.D.
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 Prof. Olaus Henrici, Ph.D.
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John Eliot Howard, F.L.S.
 Sir Henry Sumner Maine, LL.D.
 Edmund James Mills, D.Sc.
 Rev. Stephen Joseph Perry,
 F.R.A.S.
 Henry Wyldbore Rumsey, M.D.
 Alfred R. C. Selwyn, F.G.S.
 Charles William Wilson, Major
 R.E.

Thanks were given to the Scrutators.

June 11, 1874.

JOSEPH DALTON HOOKER, C.B., President, in the Chair.

Mr. William Thomas Blanford, Dr. Thomas Lauder Brunton, Professor W. Kingdon Clifford, Mr. Prescott G. Hewett, Mr. John Eliot Howard, Dr. Edmund James Mills, the Rev. Stephen Joseph Perry, and Major Charles William Wilson were admitted into the Society.

The Presents received were laid on the table, and thanks ordered for them.

The following Papers were read :—

- I. "Note on the Absorption-Spectra of Potassium and Sodium at low Temperatures." By H. E. ROSCOE, F.R.S., and ARTHUR SCHUSTER, Ph.D. Received April 30, 1874.

In order to obtain the absorption-spectrum afforded by the well-known green-coloured potassium vapour, pieces of the clean dry metal were sealed up in glass tubes filled with hydrogen, and one of these was then placed in front of the slit of a large Steinheil's spectroscope furnished with two prisms having refracting angles of 45° and 60° . The magnifying-power of the telescope was 40, and was sufficient clearly to separate the D lines with one prism. A continuous spectrum from a lime-light was used, and that portion of a tube containing the bright metallic globule of potassium was gently heated until the green vapour made its appearance. A complicated absorption-spectrum was then seen, a set of bands (α) in the red coming out first; whilst after a few moments two other groups appeared on either side of the D lines, the group β (less refrangible) being not so dark as the group γ . These bands are all shaded off towards the red, and in general appearance resemble those of the iodine-spectrum. In order to assure ourselves that the bands are not caused by the presence of a trace of an oxide, tubes were prepared in

which the metal was melted in hydrogen several times on successive days until no further change in the bright character of the globule could be perceived. On vaporizing the metal, which had been melted down to a clean portion of the tube, the bands were seen as before, and came out even more clearly, the globule, after heating, exhibiting a bright metallic surface. An analysis of the potassium used showed that it did not contain more than 0·8 per cent. of sodium, although, of course, the double line D was always plainly seen.

In order to ascertain whether an alteration in the absorption-spectrum of the metal takes place at a red heat, fragments of potassium were placed in a red-hot iron tube, through which a rapid current of pure hydrogen gas was passed, the ends of the tube being closed by glass plates. The magnificent green colour of the vapour was clearly seen at this temperature, on looking through the tube at a lime-light placed at the other end. Owing, doubtless, to the greater thickness or increased pressure of the vapour, the bands seen by the previous method could not be resolved by the small spectroscope employed, the whole of the red being absorbed, whilst a broad absorption-band in the greenish yellow was seen occupying the place of the group γ .

The positions of the bands obtained by the first method were measured by means of a telescope and distant scale, and the wave-lengths obtained by an interpolation curve, for which well known air-lines were taken as references. The following numbers give the wave-lengths of the most distinct, that is, the most refrangible edge of each band. As the measurements had to be made quickly, owing to the rapid darkening of the glass by the action of the metallic vapour, these numbers do not lay claim to very great accuracy, but fairly represent the relative positions of the band, and show that they do not always occur at regular intervals, although they are pretty regularly spread over the field and all are shaded alike.

Bands of potassium shaded off towards red. Wave-lengths in tenths-metres :—

6844	6459	6311	5949	5763
6762	6430	6300	5930	5745
6710	6400	6275	5901	5732
6666	6379	6059	5860	5712
6615	6357	6033	5842	5700
6572	6350	6012	5821	5690
6534	6331	5988	5802	5674
6494	6322	5964	5781	5667

The bright potassium-lines in the red and violet were not seen reversed, the intensity of the lime-light being too small at both extremes to render an observation possible.

In order to ascertain whether the vapour of sodium, which, when seen in thin layers, appears nearly colourless, exhibits similar absorption-bands,

tubes containing the pure metal, which had been manufactured and preserved out of contact with any hydrocarbon, were prepared, the metal being obtained free from oxide and the absorption-spectrum being observed in the manner already described. As soon as the metal began to boil, a series of bands in the blue (Na γ) made their appearance, and shortly afterwards bands in the red and yellow (Na α), stretching as far as the D lines, came out. At this period of the experiment the D lines widened, thus blotting out a series of fine bands occurring in the orange (Na β), some of which, consequently, could not be mapped. All the bands of the sodium-spectrum shade off, like the potassium-bands, towards the red.

When the vapour of sodium is examined in a red-hot iron tube, the colour of the lime-light, as seen through it, is a dark blue. As the sodium is swept away by the current of hydrogen passing through, the colour becomes lighter, and the transmitted rays can be analyzed by the spectroscope. At first, the whole red and green and part of the blue is cut out entirely. The D lines are considerably widened, and an absorption-band is seen in the green, apparently coinciding with the double sodium-line, which comes next in strength to the D lines. All the colours, therefore, seem to be shut out, except part of the orange, part of the green, and the ultra-blue. As the sodium-vapour becomes less dense, more light passes through, and the same absorption-bands are seen as are observed in the other method. The vapour then has a slight bluish-green tint, but is nearly colourless.

The following numbers give the wave-lengths of the more refrangible edge of the sodium absorption-bands in tenth-metres, obtained in the manner above described:—

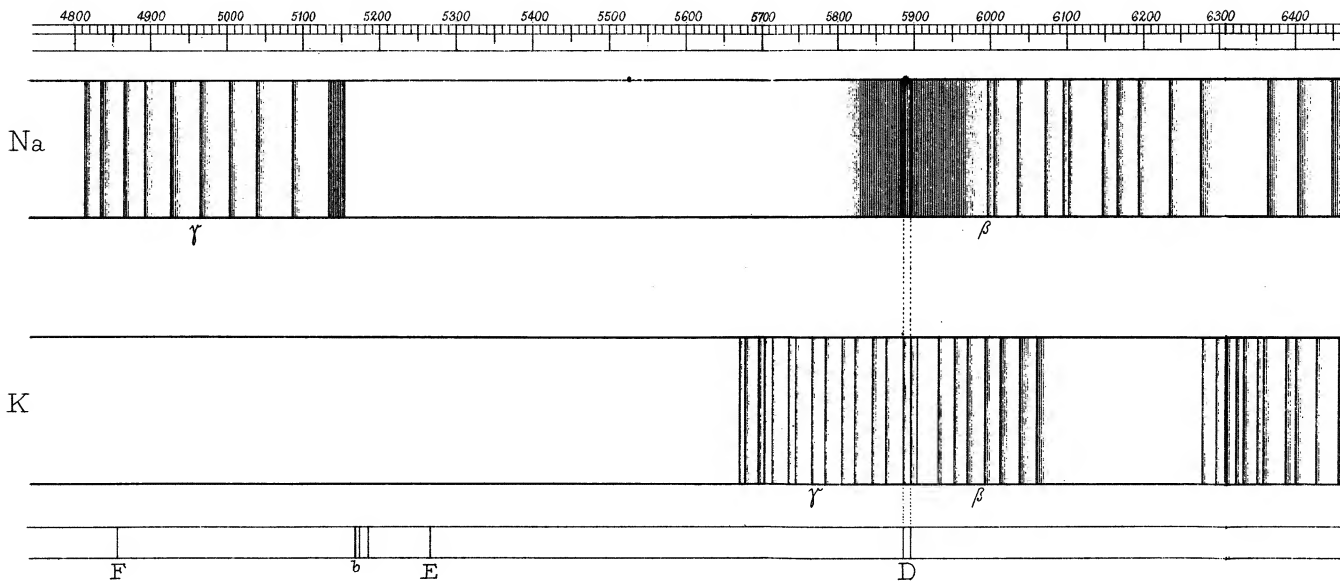
6668	6361	6105	5999	β	4964
6616	6272	6092	5150		4927
6552	6235	6071	5129		4889
6499	6192	6051	5082	γ	4863
6450	6162	6035	5038		4832
6405	6149	6016	5002		4810

Plate IV. shows the general appearance of the two absorption-spectra.

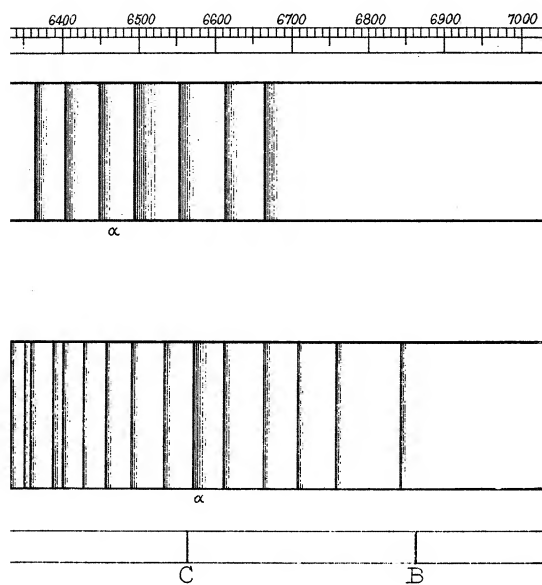
II. "Note on the alleged Existence of Remains of a Lemming in Cave-deposits of England." By Professor OWEN, C.B., F.R.S. Received April 25, 1874.

In the "Report on the Exploration of Brixham Cave" (Phil. Trans. 1873) it is stated (p. 560):—"With the appearance in the cave of the smaller common rodents now living in this country, we have to note a remarkable exception, that of the Lemming (*Lagomys spelæus*)." And again, in the list of animal remains as determined by Dr. Falconer and by

Roscoe & Schuster



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W. West & Co. imp.

